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ABSTRACT

To determine if a significant relationship exists between the conceptual systems of principals and academic achievement, nine hypotheses were formulated stating that there is no statistically significant relationship between student achievement and the complexity of school environment, emphasis on academic achievement, professional training levels, sex, age, and years of experience of principals, school size, location, and student expenditure with respect to the principal's conceptual system. Of 43 randomly selected principals in 9 school districts located in Harris and Fort Bend Counties in the metropolitan area of Houston, Texas, 40 participated in Paragraph Completion Method tests to determine their conceptual system. Academic Achievement at each school was determined by using the composite scores of the Iowa Tests of Basic Skills. An Analysis of Variance (ANOVA) was used to find any significance between the nine aforementioned variables and achievement. Based on the results, four of the nine hypotheses were not supported. Significant differences in achievement with respect to the principal's conceptual system were found in sex, school size, location, and student expenditure. Comprehensive explanations of procedures and results are included. (21 references) (EJS)

An Analysis of Middle Level Principals' Conceptual Systems in Relation to Student Academic Achievement

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Principals' Conceptual Systems: A Key Factor in Student Academic Achievement

As our society becomes more complex, we are faced with the continuous demand for school principals who are conceptually abstract persons. The principalship places inordinate time demands on the principal in terms of the nature, number and scope of problems to be handled. To conceptualize, the principal must be able to cognitively organize information to be effective. Operationalizing theories into practice presents a linkage in administrative behavior that is positively and meaningfully related to school and leadership effectiveness. A person's conceptual system is the pattern of information processing that an individual uses to interpret stimuli. One's conceptual system, also known as one's cognitive structue, is a mental pattern---a habitual way of dealing with stimuli (Silver, 1983). Harvey, Hunt, and Schroder (1961) defined conceptual systems as a pattern of information-processing which are ordered along a concrete-abstract dimension. Studies, reports, surveys, and research indicate that student academic achievement need bolstering. Never before have the relationships between conceptual systems and cognitive functioning been so urgently needed as they are today.

After two decades of quiet, almost unnoticed accountability of school leaders for achievement, the Conceptual Systems Theory seems to be a useful framework for generating knowledge about how principals' conceptual levels affect student academic achievement (Schroder, Driver, and Streufert, 1967). It is time to investigate this least known attribute of school principals. The literature revealed that interest in the Conceptual Systems Theory grew in the 1960s and 1970s. A close examination of the literature which treats conceptual complexity in the 1980s is almost non-existent. No investigations have been reported on middle level principals' conceptual levels and student academic achievement per se to infer if the conceptual levels of principals correlate with the complexity of the environments these principals create for student academic achievement. Adequate data could provide inferential evidences for careful principal selection.

In view of the preceding discussion, the purpose of this study was to determine the difference in middle level school principals' conceptual systems and student academic achievement as related to the variables: complexity of the school environment, emphasis on academic achievement, professional training, sex age, size of the school, location of the school, expenditure per student, and years of experience as a principal. Specifically, the major question to be answered in this investigation was "Do the conceptual levels of middle level principals correlate with student academic achievement?" The question raised in this investigation gave rise to the formulation and testing of nine hypotheses.

It was hypothesized that there is no statistically significant difference between middle level school principals' conceptual systems and overall student academic achievement of a school. The following specific hypotheses were formulated and tested:

HO_1: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to a school determined to have a complex school environment.

HO_2: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to schools that show a strong emphasis on achievement.

HO_3: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to the principals' levels of training.

HO_4: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to sex.

HO_5: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to age.

HO_6: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to school size.

HO_7: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to school location.

HO_8: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to student expenditure.

HO_9: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to the number of years of principalship experience.

In order to test the hypotheses, the Paragraph Completion Method (PCM), developed by Hunt (1978), was utilized to assess the conceptual levels of the junior high and middle school principals. The 1985-86 Annual Performance Reports from each school district were collected by the researcher to obtain a publication of achievement measures. For this investigation, the composite scores on the Iowa Tests of Basic Skills (ITBS) for seventh grade were used to determine academic achievement. All of the 40 instruments administered were usable.

In summary, the study was designed to determine the difference of middle level school principals' conceptual systems and student academic achievement as related to the variables: complexity of the school environment, emphasis on academic achievement, professional training, sex, age, size of the school, location of the school, expenditure per student, and years of experience as a principal.

Method

Subjects

The population of this investigation consisted of 68 principals assigned to seventeen school districts located in Harris and Fort Bend Counties in the Metropolitan area of Houston, Texas. The sample population in this investigation included 43 randomly selected principals assigned to nine school districts. Of the 43 randomly selected principals in the sample population, 40 participated (26 males, 14 females). This investigation was conducted during the fall semester of the 1986-87 academic school year. A distribution of the principal sample by complexity of the school environment revealed that all 40 (100%) of the principals offered counseling services, a library, and a clinic, but 1 (2.5%) principal did not offer a foreign language program. A distribution of the principals by achievement

emphasis revealed that 38 (95%) of the principals issued school level awards and offered tutorial programs, but 8 (20%) of the principals did not offer a national junior high school honor society and 16 (40%) of the principals stated that district level achievement awards were not issued to their students. A distribution of the subjects by professional training levels indicated that there were 1 (2.5%) of the principals with a Bachelor's Degree, 1 (2.5%) that had some graduate studies but had not received the Master's Degree, 14 (35%) had Master's Degrees, 23 (57.5%) had completed graduate studies beyond the Master's Degree, and 1 (2.5%) had a doctorate. Regarding age, 38 (95%) of the principals were between 30 and 59 years old. Thirty-one (77.5%) of the principals were assigned to schools with a student population between 801 and 1400. There were 34 (85%) of the principals assigned to schools located in suburban areas, 4 (10%) of the principals were located in urban areas, there were no (0%) principals located in inner city schools, and there were 2 (5%) of the principals assigned to schools in rural areas. For the 1985-86 school year, 20 (50%) of the principals were assigned to schools which spent between $3001 and $3500 per student. Twenty-nine (72.5%) of the principals had between one and ten years of principalship experience.

Procedures

District personnel from each of the nine school districts was called to schedule an appointment for a personal visit by the researcher to explain the purpose of this study, to obtain permission to collect data in their districts, and to get permission to contact middle level principals. The researcher explained that the paper-pencil measure needed to be administered by the researcher in a group setting requiring twenty minutes of the principal's time. Each school district was given information about the investigator and a description of the proposed research.

After receiving permission from district personnel to collect data in their districts, the principals were sent letters regarding the visit, explaining the purpose of this investigation, the instrument, and to confirm a date of a visitation by the researcher to collect data. They were given assurance that no school district, school or participant would be identified by name in the study. The data collected were related to the principals' responses to the six topics of the instrument. Other data relating to demographics (sex, achievement emphasis, training levels, age, school size, school location, expenditure per student, experience, and school complexity) were collected and coded for research purposes only. No response was scored as right or wrong answers. The principals were reminded that neither their names nor their school districts would be identified with their responses.

The Paragraph Completion Method was administered to the principals and the demographic data were collected at the time of the visitation by the researcher. A 1985-1986 Annual Performance Report was requested by the researcher on this visit. Following the visit, the principals' responses were then scored. The responses were classified by assigning a score from 0-3 to each of the six responses and by aggregating those separate scores into a total conceptual score. After aggregating the separate scores on the Paragraph Completion Method to obtain a total conceptual score, a distribution of the principals revealed that one of the 40 principals was classified as requiring much structure (0.1.1), four of the 40 principals required some structure (1.2-1.4), five of the 40 principals required less structure (1.5-1.9), and 30 of the 40 principals required little structure (2.0-3.0). Specifically, the analyzed data were concerned with the middle level school principals' conceptual systems in relation to student academic achievement as measured by the Paragraph Completion Method and district annual performance reports in reference to sex, achievement emphasis, training, age, school size, school location, expenditure per student, experience, and school complexity.

Description of Measures Used

In search of an instrument, the researcher referred to Buros (1981) and Mental Measurement Yearbooks (1961, 1965) and found no instrument which could serve properly to measure the constructs which were analyzed in this investigation. The next approach was to contact other researchers by telephone and written correspondence who had conducted previous studies utilizing the Conceptual Systems Theory. The Paragraph Completion Test (PCT), sometimes called the Sentence Completion Test (SC) or the Paragraph Completion Method (PCM), was developed (Harvey, Hunt, and Schroder) specifically to measure an individual's integrative ability and his/her capacity to interrelate concepts at a relative concrete or abstract level. After careful consideration and approval, the PCM developed by Hunt (1978) was used by the researcher in this investigation for the collection of desired conceptual systems data.

The Paragraph Completion Method is a projective instrument consisting of six topics in which the participants first complete a sentence from a stimulus phrase and then add three additional sentences in a three-minute time limit for each topic. The six topics are designed to provide content-free measures by sampling cognitive processes in the areas of interpersonal uncertainty, conflict, and authority. The six topics are: Topic I - What I think about rules; Topic II - When I am criticized; Topic III - What I think about parents; Topic IV - When someone disagrees with me; Topic V - When I am not sure; and Topic VI - When I am told what to do. Each of the topics was scored by the procedures given by Hunt, Butler, Noy, and Rosser (1978).

The Paragraph Completion Method has consistently predicted a measure of integrative complexity using conceptual complexity as a major variable. The internal reliability of the topics inter-correlate in the .60 to .75 range as reported by Schroder (1967). The validity of the instrument has been established in over one hundred studies of personality and cognition as reported by Gardiner and Schroder (1972).

Statistical Procedure

The statistical procedure used in this study was the Analysis of Variance (ANOVA) statistical test for analyzing the differences obtained through a data-gathering instrument constructed by Hunt. The Analysis of Variance (two-way) was used to assess the independent and interactive effects of two independent variables on a dependent variable. The dependent variable in this investigation was the conceptual system. The independent variables were academic achievement, school environment, emphasis on achievement, training levels, sex, age, size of the school, location of the school, student expenditure, and years of experience as a principal. The significance level at which the hypotheses were tested were at the .05 level.

Results

Nine hypotheses were formulated for testing to determine if there were significant differences in the conceptual systems of junior high and middle school principals and student academic achievement as related to the complexity of the school environment, emphasis on academic achievement, professional training levels, sex, age, size of school, location of the school, student expenditure, and years of experience as a principal. After aggregating the separate scores on the Paragraph Completion Method to obtain a total conceptual score, a distribution of the principals revealed that one of the 40 principals was classified as requiring much structure (0.1.1), four of the 40 principals required some structure (1.2-1.4),

five of the 40 principals required less structure (1.5-1.9), and 30 of the 40 principals required little structure (2.0-3.0).

HO_1: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to a school determined to have a complex environment.

Principals who have conceptual systems that range from much, some, less to little structure also have schools where the average student grade equivalents range from 6.3, 6.7, 7.0 to 7.7, respectively.

Revealed in Table 1 are the analyses of variance results for the main effects, academic achievement, and the complexity of the school environment. As indicated in the table, significant differences between main effects ($F = 2.00$, $df = 5$), academic achievement ($F = 2.26$, $df = 4$), and complexity of the school environment ($F = 0.32$, $df = 1$) were not influenced by the conceptual systems of junior high and middle school principals. Also, the interaction effects of academic achievement and complexity of the school environment ($F = 0.05$, $df = 1$) were not significant. Therefore, hypothesis one was supported.

Table 1
Analysis of Variance Summary Table for Academic Achievement and Complexity of School Environment on Conceptual Systems

Source	SS	df	MS	F
Main Effects	5.48	5	1.10	2.00 ns
Academic Achievement (A)	4.96	4	1.24	2.26 ns
Complexity of School (B)	0.18	1	0.18	0.32 ns
Interaction				
A x B	0.03	1	0.03	0.05 ns
Within	18.09	33		
Total	23.60	39		

$P = .05$, $df = 5$, $cv = 2.49$

HO_2: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to schools that show a strong emphasis on achievement.

Principals who had conceptual systems that require much and some structure had schools where students were below grade equivalent. However, as emphasis on achievement increased, there was an increase in achievement. The principals who had conceptual systems that required less and little structure and who placed a stronger emphasis on achievement had schools where the students were at grade level.

Present . in Table 2 are the analyses of variance results for the main effects, academic achievement, and emphasis on achievement on conceptual systems. As indicated in this table, significant differences between the main effects ($F = 2.24$, $df = 5$), academic achievement ($F = 2.42$, $df = 4$), and emphasis on academic achivement ($F = 0.65$, $df = 1$) were not influenced by the conceptual systems of junior high and middle school principals. Furthermore, the interaction

effects of academic achievement and the emphasis on achievement (F = 2.67, df = 1) were not significant. Therefore, hypothesis two was supported.

Table 2
Analysis of Variance Summary Table for Academic Achievement and Emphasis on Achievement on Conceptual Systems

Source	SS	df	MS	F
Main Effects	5.63	5	1.13	2.24 ns
Academic Achievement (A)	4.87	4	1.22	2.42 ns
Emphasis on Achievement (B)	0.33	1	0.33	0.65 ns
Interaction				
A x B	1.35	1	1.35	2.67 ns
Within	16.63	33		
Total	23.60	39		

P = .05, df = 5, cv = 2.49

HO_3: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to the principals' levels of training.

A comparison of the academic achievement of students, the conceptual systems of principals, and the training levels of the principals indicated that one principal with a Bachelor's Degree had a conceptual system that required some structure and had a school where the students were one grade equivalent above level. The principals who had conceptual systems that required some and less structure and who had completed some graduate study had schools where the students were below grade level. The achievement of the students increased as the principals acquired Master's Degrees and above and had conceptual systems that required little structure.

Table 3 reported that there is no significant differences between the main effects (F = 1.36, df = 8), academic achievement (F = 1.85, df = 4), and the training levels of principals (F = 0.34, df = 4). Also, there was no significance with respect to the interaction between academic achievement and the training levels of the principals with respect to conceptual systems of middle level principals (F = 1.18, df = 3). Therefore, because there were no significant differences reported in the academic achievement of students and the training levels, or by interaction, hypothesis three was supported.

Table 3
Analysis of Variance Summary Table for Academic Achievement and Training Levels on Conceptual Systems

Source	SS	df	MS	F
Main Effects	6.06	8	0.76	1.36 ns
Academic Achievement (A)	4.11	4	1.03	1.85 ns
Training Level (B)	0.76	4	0.19	0.34 ns
Interaction				
A x B	1.98	3	0.66	1.18 ns
Within	15.57	28		
Total	23.60	39		

P = .05, df = 8, cv = 2.29

HO_4: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to sex.

A comparison of the academic achievement of students, the conceptual systems of principals, and the sex of the principals did not support the hypothesis. There were 26 male and 14 female principals. Male principals who had conceptual systems that required some and less structure had schools where the students were below grade equivalent. However, the male principals whose conceptual systems required little structure had schools where students were achieving at grade equivalent. On the other hand, female principals' conceptual systems did not impact on the academic achievement of the students. All female principals, regardless of their conceptual systems, had schools where students were either at or above grade equivalent.

As shown in the analysis of variance of Table 4, statistical significance was found between the main effects (F = 4.48, df = 5), academic achievement (F = 4.60, df = 4), sex (F = 6.18, df = 1), and in the interaction between academic achievement and sex (F = 6.09, df = 3). Therefore, because significance was found between the main effects, academic achievement, sex, and in the interaction between academic achievement and sex, hypothesis four was not supported.

Table 4
Analysis of Variance Summary Table for Academic Achievement and Sex on Conceptual Systems

Source	SS	df	MS	F
Main Effects	7.34	5	1.47	4.48*
Academic Achievement (A)	6.07	4	1.52	4.60*
Sex (B)	2.04	1	2.04	6.18*
Interaction				
A x B	6.03	3	2.01	6.09*
Within	10.23	31		
Total	23.60	39		

* Significant at the .05 level of probability. df = 5, cv = 2.51

HO_5: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to age.

A comparison was made of the academic achievement of students, the conceptual systems of the principals, and the age of the principals. Principals who had conceptual systems that required some structure in the 40-49 age group, and principals who had conceptual systems that required much structure in the 50 and above age group had students who were below grade level.

As revealed in Table 5, significant differences between the main effects (F = 1.50, df = 7), academic achievement (F = 1.79, df = 4), and age of the principals (F = 0.53, df = 3) were not found to be influenced by the conceptual systems of junior high and middle school principals. Also, the interaction of academic achievement and age (F = 0.44, df = 5) was not significant. Therefore, hypothesis five was supported.

Table 5
Analysis of Variance Summary Table for Academic Achievement and Age on Conceptual Systems

Source	SS	df	MS	F
Main Effects	6.24	7	0.89	1.50 ns
Academic Achievement (A)	4.26	4	1.06	1.79 ns
Age (B)	0.94	3	0.31	0.53 ns
Interaction				
A x B	1.30	5	0.26	0.44 ns
Within	16.06	27		
Total	23.60	39		

P = .05, df = 5, cv = 2.51

HO_6: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to school size.

Principals who have conceptual systems that required some and little structure and who were assigned to small-sized schools had students who were achieving below grade equivalent. However, all of the principals who had conceptual systems that required less and little structure and who were assigned to medium-sized schools had students who were performing at grade level. Principals who had conceptual systems that required some and little structure and who were assigned to large-sized schools had students who were achieving at grade level.

Revealed in Table 6 are the analyses of variance results for the main effects, academic achievement, and school size. As indicated in this table, significant differences with respect to the main effects ($F = 1.75$, $df = 8$), academic achievement ($F = 2.05$, $df = 4$), and school size ($F = 0.51$, $df = 4$) were not found to be influenced by the conceptual systems of middle level principals. The interaction effects of academic achievement and school size ($F = 2.68$, $df = 5$) were significant.

Table 6
Analysis of Variance Summary Table for Academic Achievement and School Size on Conceptual Systems

Source	SS	df	MS	F
Main Effects	6.20	8	0.77	1.75 ns
Academic Achievement (A)	3.63	4	0.91	2.05 ns
School Size (B)	0.90	4	0.22	0.51 ns
Interaction				
A x B	5.92	5	1.18	2.68*
Within	11.49	26		
Total	23.60	39		

* Significant at the .05 level of probability df = 8, cv = 2.32

HO_7: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to school location.

Principals who had conceptual systems that required some, less, and little structure and who were located in suburban areas had schools where the students were performing at grade level. All of the principals, regardless of conceptual systems, and who were located in urban areas had students who were performing below grade level. On the other hand, all of the principals with conceptual systems that required some and less structure had schools where students were achieving at grade equivalent.

Results of the two-way analyses of variance for the main effects ($F = 2.95$, $df = 6$), as shown in Table 7, revealed significant differences. Academic achievement ($F = 2.06$, $df = 4$), and school location ($F = 3.26$, $df = 2$) revealed no significant differences. The interaction effects between academic achievement and school location ($F = 0.86$, $df = 1$) were not found to be significant. Therefore, hypothesis 7 was not supported.

Table 7
Analysis of Variance Summary Table for Academic Achievement and School Location on Conceptual Systems

Source	SS	df	MS	F
Main Effects	8.39	6	1.40	2.95*
Academic Achievement (A)	3.91	4	0.98	2.06 ns
School Location (B)	3.09	2	1.55	3.26 ns
Interaction				
A x B	0.02	1	0.03	0.86 ns
Within	15.19	32		
Total	23.60	39		

* Significant at the .05 level of probability df = 6, cv = 2.40

HO_8: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to student expenditure.

Principals who had conceptual systems that required some, less, and little structure and expenditures of $0-2,500 per student had schools where student achievement was at grade level. All principals, regardless of conceptual systems, who had expenditures of $2,501 and above per student had schools where student achievement was at grade level.

As shown in Table 8, a significant difference was found in the main effects ($F = 6.22$, $df = 8$). No significant difference was found for academic achievement ($F = 2.72$, $df = 4$). However, statistical significance was found for student expenditure ($F = 7.08$, $df = 4$). Furthermore, the interaction effects of academic achievement and student expenditure were significant ($F = 4.70$, $df = 4$) with respect to the conceptual systems of junior high and middle school principals. Therefore, hypothesis eight was not supported.

Table 8
Analysis of Variance Summary Table for Academic Achievement and Student Expenditure on Conceptual Systems

Source	SS	df	MS	F
Main Effects	12.29	8	1.54	6.22*
Academic Achievement (A)	2.69	4	0.67	2.72 ns
Student Expenditure (B)	6.99	4	1.75	7.08*
Interaction				
A x B	4.65	4	1.16	4.70*
Within	6.67	27		
Total	23.60	39		

* Significant at the .05 level of probability df = 8, cv = 2.30

HO_9: There is no statistically significant difference between middle level principals' conceptual systems and student academic achievement with respect to the number of years of principalship experience.

The academic achievement of the students as compared to the conceptual systems of the principals and principalship experience supported the hypothesis. As the conceptual levels of the principals increased, regardless of the years of principalship experience, student academic achievement also increased.

Shown in Table 9 are the analyses of variance results for the main effects, academic achievement, and the number of years of principalship experience. As indicated in the table, significant differences between the main effects ($F = 1.43$, $df = 8$), academic achievement ($F = 1.90$, $df = 4$), and the number of years of principalship experience ($F = 0.53$, $df = 4$) were not found to be influenced by the conceptual systems of middle level principalship experience. The interaction effects of academic achievement and the number of years of principalship experience ($F = 0.83$, $df = 6$) did not have a significant effect on the conceptual systems of principals. Therefore, hypothesis nine is supported.

Table 9
Analysis of Variance Summary Table for Academic Achievement and Years of Principalship Experience on Conceptual Systems

Source	SS	df	MS	F
Main Effects	6.51	8	0.81	1.43 ns
Academic Achievement (A)	4.32	4	1.08	1.90 ns
Principalship Experience (B)	1.21	4	0.30	0.53 ns
Interaction				
A x B	2.84	6	0.47	0.83 ns
Within	14.26	25		
Total	23.60	39		

P = .05, df = 8, cv = 2.34

Discussion

Hypotheses one, two, three, five, and nine were supported in this investigation. As revealed in Table 1, the findings of the investigation supported hypothesis one because significant differences were not found between academic achievement and a school determined to have a complex environment with respect to middle level principals' conceptual systems. As shown in Table 2, the findings of the investigation supported hypothesis two because a significance did not exist between student academic achievement and schools that show a strong emphasis on achievement with respect to the conceptual systems of middle level principals. An analysis of data as summarized in Table 3 revealed no significant difference on conceptual systems of middle level principals and between the two variables, academic achievement and principals' level of training. In view of these findings, hypothesis three was supported. An analysis of data as shown in Table 5 revealed that academic achievement by students and the age of the principals were not influenced by the conceptual systems of middle level principals. Therefore, hypothesis five was supported. As revealed in Table 9, academic achievement and

years of principalship experience were not significant at .05 level of probability. Therefore, hypothesis nine was supported.

Hypotheses four, seven, and eight were significant at the .05 level of probability. An analysis of data as shown in Table 4 revealed that a significant difference did exist between the academic achievement of students and the sex of principals with respect to conceptual systems of middle level principals. As shown in Table 7, the findings of the investigation found a significant difference between academic achievement and the location of the school with respect to the conceptual systems of middle level principals. An analysis of data summarized in Table 8 revealed a significant difference on conceptual systems between the main effects of academic achievement and student expenditure. With regard to interaction effects, the combined effects of academic achievement and sex, academic achievement and school size, academic achievement and school location, in addition to academic achievement and student expenditure produced significant differences at the .05 level.

In analyzing the effects of academic achievement and the complexity of the school environment on conceptual systems, a significant difference was not found. The results of this finding do not support those of Lee & Schroder (1969), Sobel (1970), Schneider & Giambra (1971), and Rathbone & Harootunian (1971) who, based on their findings, found a relationship between environment complexity and student achievement.

Contrary to Bennett (1986) who found a significant positive correlation between student achievement and a strong emphasis placed on academic courses, this investigation revealed no significant difference between academic achievement and the principals' conceptual systems with respect to emphasis on student performance. In analyzing the effects of academic achievement and the principals' levels of training on conceptual systems, a significant difference was not found. This finding does not support those of Lipman & Hoeh (1974), Butera (1976), and Allen, Pellicer & Boardman (1984) who, based on their findings, found a relationship between academic achievement and the levels of training of the principals.

The analyzed data support the formulated hypotheses with respect to sex, school size, school location, and student expenditure. In analyzing the effects of conceptual systems and academic achievement with respect to sex, a significant difference was found. This finding supports that of Harris (1981). The finding of this investigation with respect to school size substantiated the work of Zimman (1980), who found a direct relationship between academic achievement and school size with respect to conceptual systems. The results of this investigation support the findings of many experts with respect to school location. A significant difference was found between academic achievement and school location on the conceptual systems of middle level principals. Clark (1972), Edmonds (1979), and Faulkner & O'Reilly (1981) who, based on their findings, concluded that principals do engineer the school through assertive leadership, an orderly school environment, and expectation for student achievement based on student learning outcomes. The results of this investigation on the conceptual systems of middle level principals and academic achievement with respect to student expenditure, support the work of Matthews & Brown (1976) who, based on their findings, found a positive correlation between financial resources and student achievement with respect to the conceptual systems of principals.

In summary, with regard to the formulated hypotheses, all of the main effects and the interaction effects with respect to the conceptual systems of middle level principals were not found to be significant at the .05 level. Based on the findings of this study, there is a parallel between principals' conceptual systems and student learning outcomes. Conceptually abstract principals reflect higher-order cognitive objectives while their counterparts who are conceptually concrete tend to provide instructional programs that require memorization and repetition of facts.

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